L.S. [X-5]

Previous references.
D.097-20 (1-6)
Ire 74-20 (1-6)

Later references.

1921-29.
(9.14.

File No. 131-22.
Serial Nos. 1 — 6:

GENERAL AND REVENUE SECRETARIAT.

Serial Nos. 6

Part B for Oct 23

SUBJECT

Proposals for the manufacture of Sulphuric Acid.

M.6. From The Director of Industries & Commerce. No. 4877/C d. 10.10.23. — States that the Bhadravati Iron Works have intimated that they have no intention of starting a bigger plant for the manufacture of Sulphuric Acid and he will meanwhile take advantage of the deputation of an officer in connection with the British Empire Exhibition to get full information: machinery etc. and resubmit his proposal with further details.

M. Oct 23

A1463

F. R. S. 11]

1922-23

GENERAL AND REVENUE SECRETARIAT.

(I & C)

NOTES.

File No. 131-22

FILE HEADING.

Manufacture of Sulphuric acid.

From

The Dy Director I & C

No. C. 1108 Dated 17.10.22 Received 20.10.22

Diary No.	Enclos.	Spare Copies.	Serial No.
1797	2 pls		1

BRIEF ABSTRACT OF LETTER.

Submits proposals for manufacturing Sulphuric acid, either 5 tons a day at Bhadravati or 1 ton a day at Bangalore.

NOTES AND ORDERS.

Submitted with reference (G & H)

for orders.

Sd/- VS

27.10.22

NOTES—First Sheet.

G. R. S. III-2.

General and Revenue Secretariat. | File No. 131 of 19 9[illegible]

Serial No.

The subject of the manufacture of sulphuric acid has been on the tapis since 1914, when a rough scheme was put forward by the Industries and Commerce Committee. Sir Alfred Chatterton was at that time of opinion that "the sulphuric acid industry in Mysore was impossible on a commercial basis". It was then thought that the establishment of sulphuric acid plant would lead to the establishment of industries such as the manufacture of paints and varnishes etc. in the State. The idea all along has been that the plant should be started either by the State itself with a large State aid.

2. The subject was more or less of acadamical interest and it was not until the establishment of Mysore Iron Works was decided upon, that the question took a more practical turn. A plant for the manufacture of sulphuric acid is now advocated from the point of view of utilising the large quantity of grey acetate of lime, nearly 2,500 tons, that is likely to be produced at the Iron Works.

3. There can only be a very limited use for sulphuric acid in the manufacture of paints and varnishes etc., locally, as for this purpose large quantities of gums and resins are required. These are not found in sufficient quantities within the State nor perhaps in India as a whole. Nor would their importation from outside for this purpose be a business proposition.

4. As matters stand at present the only impo

NOTE—Contn. sheet.

Serial No.

important industry for which sulphuric acid will be required is for the manufacture of acetic acid from the grey acetate of lime produced at Bhadravati, more especially because at the present time there i no immediate market for the crude acetate. Should be possible to start this industry locally, then it might be hoped that other smaller industries like t manufacture of paints and varnishes would follow ir its wake in due course.

Not quite accurate. The recommendation the Sc Bd sent up two years ago nearly was not accepted by Govt. & that Bd have no interest in the matter again. It is the Director, who is pressing the point now

5. Both the Scientific Board and the Director of Industries have now attempted to make out a case for the establishment of a sulphuric acid plant in Mysore. But the chief draw-backs of the proposal seem to be as follows:--

(i) All the raw materials in the shape of sulphe nitrates etc., have to be imported from outside, there being no material locally available which co be used for the purpose, as for instance, pyrites.

(ii) The heavy freight costs to be paid on these imported materials. The plant would of course hav to be established in conjunction with the Iron Wor at Bhadravati. If Bangalore is bad enough from t point of view of situation, Bhadravati is worse. In this respect the plants set up on the sea boar (at Madras, at Calcutta, at Bombay and even at Jamshedpur) would have a decided advantage over th plant that we might instal hereafter.

(iii) At the present moment it is reported tha all the other sulphuric acid plants in India are working half time.

NOTE—Contn. sheet.

Serial No.

(iv) Even the acetic acid that might be produced locally cannot be placed on the market without incurring heavy freight costs.

(v) The crude acetate might be exported in bags but the transport of acetic acid would involve the purchase or manufacture of steel or earthen-ware jar which would add heavily to the capital cost.

6. The question of converting the grey acetate of lime into acetic acid was already once before considered in the year 1919 when Govt. had an idea of transferring the sulphuric acid plant installed by t Tatas at Jamshedpur to Bhadravati. The suggestion was however dropped on account of the additional capital expenditure involved.

7. Mainly on account of the increased cost of freight involved in delivering the acetic acid in th principal markets, such as the Strait Settlements etc., Mr. Marshall was of opinion that a more advantageous course would be to instal the plant in the midst of the Rubber Plantations at Singapur by arriving at an understanding with the Rubber Growers and running the conern on a partnership basis. Mr. Perin has also put forward a similar proposition and states that it would be possible to induce a reputed English firm to establish an acetic acid plant at Singapur in case Govt. are prepared to find half the capital cost. The whole question requires careful investigation. Even if the proposition is found a favourable one it would still be doubtful if Govt. can either afford

NOTE—Contn. sheet.

Serial No.

afford to participate in or render any substantial aid to such an undertaking.

8. The question now for consideration is whether the proposal to instal a sulphuric acid plant at Bhadravati to manufacture acetic acid may be accepted as a feasible one. The other considerations urged in favour of the proposal, viz., that sulphuric acid is a "Key Industry", that the establishment of such a plant would lead to the manufacture of alum, ferrous sulphate, super-phosphates etc., are of a minor character and not of any immediate importance partly for want of raw materials locally to work with and more particularly for want of any steady and large demand for the output.

9. From all points of view it would appear that the starting of a sulphuric acid plant locally is not likely to prove a paying proposition and that as regards the calcium acetate, if arrangements cannot be made to manufacture the acetic acid at some place nearer the markets, there is no other course than to get rid of the crude ~~acetate~~ grey acetate in form. At any rate there can perhaps be no question of Govt either promoting or participating in any such undertaking.

10. Hitherto, however, the question has been mainly viewed from the stand point of manufacturing acetic acid from the grey acetate. It does not appear that anyone has considered another aspect of the question which perhaps is equally worthy of investigation, viz., the manufacture of acetone, directly from the grey acetate of lime without sulphuric acid treatment.

NOTE—Contn. sheet.

11. The accompanying extracts from certain Scientific Journals which I have been able to obta[in]* show thst the manufacture of acetone direct from acetic acid by dry distillation is a sufficiently well known process and just as paying as the manuf[acture] of acetic acid. The translated extract from German book gives some idea of the details of the proce[ss] and all of them explain the ways in which the acet[one] might be utilised. Indeed the writer in the "Chemical and Metallurgical Engineering", (an Amer[ican] Journal) is of opinion that in all probability the price of acetic acid obtained from sources other th[an] wood distillation will be such that it will be impossible for the acetic acid manufacture from gr[een] acetate to compete. He observes that a "life say in the situation is that the wood distillation industry possesses in acetone, crude acetone oils and wood tar, a very valuable source of, as yet, un[-] discovered revenue. The opinion of the several experts go to show that it should be possible for to manufacture acetone direct from the acetate of lime. The acetone so manufactured would be of as m[uch] use commercially and industrially as sulphuric and acetic acids both as solvents and in other ways.

12. Another great advantage in manufacturing acetone seems to be that we need be under no appre[-] hension as regards its immediate disposal. Statistical information is not readily available in the publi[c] trade reports about the quantity of acetone impor[ted] into India, but it is just possible that the Indi[an]

NOTE—Contn. sheet.

*(Through the courtesy of Dr. Narasimhaswamy, Agricultural Chemist).

* B (Typed)
* C (Printed)

Serial No.

Indian Munitions Board would be able to take up all the acetone that we may be able to manufacture as the Govt. of India would scarcely think of permitting its export to other countries. There is a Cordite Factory at Ootacamund which might be able to absorb all our output. Even otherwise the material is used largely in the manufacture of explosives of which the Gold Fields are one of the largest consumers in India. Further it might be possible to induce the Munitions Board to start a Factory for treating the grey acetate and converting it into acetone in conjunction with our own works at Bhadravati. This would relieve us of the trouble of exporting the crude acetate on the one hand and additional capital expenditure on the other if we had to start a supplemental factory ourselves. The Govt. of India would no doubt be interested in the proposition in as much as their acetone work at Nasik (by the fermentation process) has not proved quite remunerative and has been closed down.

13. The above suggestion is only put forward as one that might be further investigated. If on further examination the suggestion is found to be of any practical value a scheme might be prepared after obtaining necessary information about the plant and other equipment required. The suggestion has this perhaps to commend it, that there is no expenditure involved in any intermediate processes.

14. If approved the question may be referred back to the Board of Scientific Advice for further

NOTE—Contn. sheet.

Serial No.

further consideration. Dr. Smeeth and the Secretary to the Board of Management of the Iron Works may also be requested to favour Government with their opinion.

MR
11.11.22

5) General Sec'y

Perhaps the matter may be discussed with Mr Perin when he next comes to Bangalore. If money is found to be found by Govt for works in Singapore, it may have to be considered first whether with the same money we cannot obtain an equally successful concern in our State. The difficulty of railway rates has perhaps been solved — To transport acetate of lime is easier than to transport acetic acid but whether the extra cost of transporting acetic acid cannot be counterbalanced by other ~~advantages~~ Compensating advantages has to be considered

NOTE—Contn. sheet.

G. R. S. III-2]

General and Revenue Secretariat.

File No. 131 of 19

Serial No.

Perhaps the requirements of the Munitions Board may also be ascertained if the Prime approves of the idea.
First Member

B. 14/11/22.

Mtr 14/11/22

16)

4029-414
14.11.22

The proposal is neither new nor novel. After elaborate discussion the Geographical Board recommended the establishment of a Sulphuric Acid factory in connection with the Iron works but this recommendation itself is not. It is a question of relative advantage and as matters stand the Scheme which offers more advantage from the financial point of view has to be preferred. No doubt the Sulphuric Acid factory is called a "key" industry but such factors particularly need have to be carefully considered in coming to a decision. Sentiment cannot always be placed in the fore front in a matter like this.

The Secretary

Rec'd 15.11.22

B. 15/11/22

NOTE—Contn. sheet

G. R. S. III-2a]

DEWAN'S MINUTE

General and Revenue Secretariat. I & C File No. 131 192 2.

Date of submission	Date of Return	Date of issue of orders in the Secretariat	Remarks
15-11-22	16-11-22		

17) I am not able to follow from the minute of the First Member what his definite recommendation is with reference to the proposal of the Director of Industries & Commerce to establish a Sulphuric Acid Factory. The proposal, as stated by him, is not new and has once been turned down by Government.

18) The Director's report does not clearly go into the commercial aspects of the case. Nor does he give any justification for Government embarking upon this industry at the present juncture. How the Director says that the Department will be able to carry out on this industry on a profitable basis is not clear. Nor is it apparent how he urges the establishment of the industry entirely independent of the Iron Works. Even in regard to the starting of a small plant there are no details. Most of the report of the Direc is of an academic character and it is difficult for Government to pass orders on such indefinite proposals. It is out of the questi owing to financial reasons, to entertain any proposal for the establishment of a large factory. As regards putting up a plant for manufacturing one ton of sulphuric acid per day, the Director does not give any information as to what the cost will be. The only statement he makes is that the expenditure may be met from the profits of the Soap Factory.

17/2

G[illegible]R. S. III-2a]

DEWAN'S MINUTE

General and Revenue Secretariat.

File No. 131 1922.

Date of submission	Date of Return	Date of issue of orders in the Secretariat	Remarks

19) He may be asked to submit detailed proposals regarding the smaller plant as an experimental measure, after taking the opinion of the Secretary to the Board of Management of the Iron Works who has, I believe, collected information on the subject of the disposal of ~~the~~ Acetate of Lime produced by the Iron Works to the best possible advantage ~~of~~ to the concern.

16.11

A. S. B. 16.11.22

16.11.22

1st Member)

20) 4097-481 / 16.11.22 Secn. [illegible]. Ishak Express may kindly push after receipt of the Director's reply in answer to the observation made in the Dewan's Minute above.

Peel
15.11.22.

A S B 18/11/22

21) Draft

18/11

WD 2314—GPB—2000—28-6-22

G. R/S. III-2]

General and Revenue Secretariat.

I & C File No. 131 of 1922.

Serial No.

22) Submitted with a draft for orders.
SRy
20.11.22

23) Clean draft
Ry
20/11

24) Typed draft is submitted.
SRy
21.11.22

Ry
21.11.22

file

25) Approved
13/12/22
Ry

2. IC 3865 D 14.12.22

To

The Offg Director I and C

Requests him to furnish detailed proposals re the smaller plant as an experimental measure after consulting the Secretary to the Board of Management of the Iron works who has [illegible] information re the disposal of the acetate of lime produced by the Iron works to the best possible advantage

from A. Secy. SECRET. of the concern.

16 DEC 1922

NOTE—Contn. sheet

G. R. S. III-21

General and Revenue Secretariat.

Dte File No. 137 of 1922

Serial No. 4

from the Hg. Dr. Dte. 753 A/3 31.8.23. States that a ton a day plant will not be economical and that he is preparing the Iron works in regard to a bigger plant.

26) Submd. for orders as to whether the papers may be filed, and the question taken up again after receipt of a further reference in regard to the starting of a factory by the Nizam Iron works.

Sd/-
5-9-23

27) Please have the papers properly arranged & submit for file. Neither the note nor the papers give a connected history of the case all scattered

Sd/-
6/9

28) The Entire correspondence (including reminders & ad interim replies) is arranged chronologically & submd.

Sd/-
6.9.23

Jr Secretary.

29) The question has to be dropped & may be taken up for consideration again when a definite scheme is received from the Director

Gen Lab 30) For perusal Sd/-
6.9.23

Sd/-
7/9

NOTE—Contn. sheet.

1.74
7.9.23.

Sd/-
10/9

G. R. S. III-2]

General and Revenue Secretariat. | I & C File No. 131 of 19 22

Serial No.

31) May not the papers be submitted to the Dewan also? Perused
8/9
15-9-23. Dewan
MR
15/9/23

DEWAN'S OFFICE.
Recd. on SEP 15 1923
Reg. No. 1715

The corp may be recalled
23.9.23

Submd. with a draft.
8/9
25-9-23.
Dewan
26/9

GEN. & REV. SECRETARIAT
25 SEP 1923
INDUSTRIES & COMMERCE BRANCH.

5 To Trichy D.O. & Govt. Trichy Dpw.
No. 1611-12 M. 22-9-23
Read the above correspondence
6 From the Director I & C
8/9 10-10-23
Intimate that
GEN. & REV. SECRETARIAT
4-OCT 1923
INDUSTRIES & COMMERCE BRANCH.
the Madawaki Iron works
have no idea of starting a bigger plant
and states that while it is difficult
to dispose of the sulphuric acid
manufactured on a large scale for
want of adequate demand he

NOTE—Contn. sheet.

G. R. S. III-2.

General and Revenue Secretariat.

I&C File No. 131 of 19 22

Serial No.

will take advantage of the deputation of an officer to attend the Empire Exh^n to obtain information about machinery etc.

May be filed after perusal.

8 Rly

12.10.23

(Revd)

Secret (Industries)

25Y
13.10.23

GEN. & REV. SECRETARIAT
16 OCT 1923
INDUSTRIES & COMMERCE BRANCH.

Note—Contn. sheet.

TELEGRAPHIC ADDRESS "INDUSTRIES"

In reply please refer to
No. AC 1108/22-23

18 OCT 1922

Ind. 131-22-1

ENCL. No. 2 files accompanied

OFFICE OF THE
DIRECTOR OF INDUSTRIES AND COMMERCE, IN MYSORE.

Bangalore 10th October 192 2.
(Camp) Mysore.

FROM -

P. G. D'SOUZA, ESQ., B.A., B.L.,
Director of Industries and Commerce in Mysore
Bangalore (India)

18 OCT 1922

To

The Secretary to the Government of Mysore,
General Department,
Bangalore.

SIR,

SULPHURIC ACID MANUFACTURE.

I have the honour to place the following before the Government for their early consideration and favourable orders:-

The early History of the case:-

About the year 1912 one Dr. Harischandra offered his services to the State to report on the possibilities of sulphuric acid manufacture in the State. The idea was to make use of the pyrites which Mr. Sambasiva Iyer had mentioned, in his Book on "The Resources of the Mysore State", as occuring in certain parts of the State. Dr. Smeeth was however, of opinion that there were no pyrites to be found in the State that would be of any use to any industry. It was thought that Dr. Harischandra might be put on special duty to settle this difference between Dr. Smeeth and Mr. Iyer and then submit a scheme to Government for the manufacture of sulphuric acid. The terms proposed by the Industries and Commerce Committee were not accepted by Dr. Harischandra and he finally went away after a brief stay at Bangalore.

Sometime later Mr. Sambasiva Iyer asked the City Progress Committee to vote Rs. 10,000/= for conducting certain experiments on the manufacture of sulphuric acid in the State. The Government decided that the proposals should be sent up to the Indian Institute of Science

P.T.O.

Science for scrutiny and report. Dr. Watson did not recommend the grant of Rs 10,000/= on the ground that no experiments were necessary in the case of the manufacture of sulphuric acid. Further, that unless sulphuric acid could be manufactured cheaply the other subsidiary industries would not thrive. So Mr. Iyer's proposals did not mature.

Next, the question was considered by a small Committee which consisted of the following gentlemen:- Dr. Sudborough of the Indian Institute of Science, Dr. Smeeth, Mr. and now Sir Alfred Chatterton, Mr. Sambasiva Iyer and Mr. Rangasawmy Iyengar. The only valuable conclusion they arrived at was that it would be desirable and profitable to manufacture sulphuric acid from imported sulphur, if the same could be manufactured at one anna a pound.

Later developments:-

The matter was then investigated by Mr. S. G. Sastry, the Industrial Chemist to the Department of Industries and Commerce. He submitted a scheme to manufacture five tons of sulphuric acid a day and the scheme was placed before the Board of Scientific Advice for their scrutiny and report. All the details of the scheme were thoroughly discussed in great detail and as a result of this, some slight alterations were introduced and the modified scheme was sent up to Government in the form of a unanimous resolution of the Board, that in the opinion of the Board it was necessary that the Government should put up a five ton a day sulphuric acid plant at Bhadravati with a view to manufacture acetic acid from the grey acetate of lime.

The special features in this recommendation of the Board were the following:-

1) Sulphuric acid could be manufactured from imported sulphur at less than one anna per pound. If the selling price could be fixed at one anna a pound substantial profits could be made.

2) One of the deterring factors formerly was that there was no immediate demand for the acid. This was got over since a demand for more than 5 tons of acid a day was shown to exist.

3) If the scheme were adopted, it would automatically solve

X another

another very important problem, namely the disposal of the grey - acetate at the Mysore Distillation and Iron Works.

4) The idea was to manufacture five tons of sulphuric acid a day and then buy up the grey acetate of lime and prepare acetic aci for which there was a big demand in India and the neighbourhood, like Ceylon and Malay States. It was then pointed out that even in case, the combined scheme of sulphuric and acetic acid manufactures did wor in such a manner that there was neither profit nor loss, it was still desirable to have the plant since the scheme provided for the purchas of the full output of the grey acetate of lime at Bhadravati and thus contribute about 4 or 5 lakhs of rupees to the Iron Scheme. It shoul be remembered that the disposal of the grey acetate of lime was and still is one of unsolved problems at Bhadravati.

The proposal of the Board of Scientific advice was however not approved by Government as the question as to how the grey acetate of lime was to be disposed of whether as grey acetate or after conversio into acetic acid could not be settled owing to inadequate knowledge o markets conditions and there was an alternative proposal to ship the grey acetate of lime to the Straits Settlements and start the manufac- ture of acetic acid there. It seems beyond doubt that the possibiliti of getting the best return from the Grey acetate is by converting it into acetic acid and not by selling it as such.

Present position:-

I personally believe that we have erred in the past by not - starting a sulphuric acid factory. Apart from the use of sulphuric ac for the manufacture of acetic acid, as soon as sulphuric acid is manufa tured in the State it will be possible to use a good deal of the outpu in the manufacture of alum, copper sulphate, Ferrous sulphate, calcium phosphate etc., for which there is a great demand in the State. The importance of this industry was very forcibly impressed on my mind during my travels in U.S.A., England, France and Germany. I am fully convinced now that no important developments of chemical industries in the State can take place without sulphuric acid.

My first recommendation is that the Government may be pleased

X to

pleased to reconsider their decision with regard to the manufacture of five tons of sulphuric acid a day at Bhadravati. The Department feels quite confident that it will be able to carry on this industry on a profitable basis. As the sulphuric acid will be utilised for other purposes besides the manufacture of acetic acid/the grey acetate from I am strongly of opinion that the industries should be carried on - - entirely independently of the Iron Works. The Iron Works may either buy the sulphuric acid from the subsidiary undertaking or sell the grey acetate of lime to the latter. In addition to the manufacture of acetic acid as I have already pointed out there are so many other requisites of industry for the manufacture of which sulphuric acid is essential.

If Government are not prepared to sanction funds for the large scheme, I request the sanction of Government for starting a small plant at Bangalore to manufacture of one ton of sulphuric acid a day. The scheme can be carried out with an expenditure of one and a half lakh of rupees. I have enclosed a copy of a letter from the Industrial Chemist on this subject for the information of Government.

As regards the funds required for the smaller plant as the latest balance sheet of the Soap Factory shows we have made a profit of - - Rs 29758/= during the year 1921-22. We are likely to have the Soap Factory under our control for another 6 months more. On the whole, I think we may safely assume a profit of Rs 50,000/= from the Soap Factory after writing off all previous losses paying of interest on all monies invested. The balance can be provided without any additional grant either from the proceeds of the Metal or the Soap Factory.

(a) I beg that Government may be pleased to sanction the original scheme for the manufacture of 5 ton of sulphuric acid per day.

(b) If for financial reasons this is not possible an alternative scheme for the manufacturing of one ton of sulphuric acid per day may be sanctioned funds being provided as suggested above.

In case Government accept either recommendation detailed plans and estimates will be sent up for sanction.

X I

Inc 134 — 22

I may state that the work of the Soap Factory has become so - - standardized that the Industrial Chemist is now in a position to devote a good portion of his time to the development of other industries. There is no line of whrk which is likely to be brought with such important results to the State as the manufacture of sulphuric acid.

I request the favour of an early reply. Two files of correspondence are enclosed herewith for your perusal & returning. I have the honour to be,

Sir,

Your most obedient servant,

DIRECTOR.

BV)

Forward for orders.

27.10.28

Letter No.709 dated the 15th September 1922, from the Industrial Chemist in charge of the Govt. Soap Factory, Bangalore, to the Director of Industries & Commerce in Mysore, Bangalore.

SULPHURIC ACID PLANT AND ESTIMATES.

I have the honour to submit herewith the following for your information and return. The papers have been taken out of the files of the Board of Scientific Advice.

Flag.(1) Original note prepared by Mr.S.G.Sastry on sulphuric acid manufacture.(This has been sent to Director of Industries & Commerce).

Flag.(2) Original estimates for a five ton a day plant to manufacture $H_2 SO_4$ prepared by Mr. S.G.Sastry(This has been sent to the Director of Industries & Commerce).

Flag.(3) Dr. Smeeth's Criticisms on Mr. Sastry's Scheme. (This has been sent to the Director of Industries & Commerce).

Flag.(4) Mr. Sastry's revised estimates, after consideration in one of the meetings of the Board. (This has been sent to the Director of Industries & Commerce).

Flag.(5).Mr. Sastry's reply to Dr.Smeeth. (This has been sent to the Director of Industries & Commerce).

After this, the scheme was again considered at one of the meetings of the Board of Scientific Advice and a resolution was sent up to Goverr -ment advising them to put up a five ton a day sulphuric acid plant at Bhadravati.

I have alos submitted the following for your kind information and return after perusal.

Flag.(6)Balance Sheet of a small Italian Firm preparing acetic acid from Grey Acetate of Lime.

Flag.(7)Estimates for an Acetic Acid Plant sent by Messrs.Walter E. Lummus Co., Boston, U.S.A. with a blue print.

Flag(8)Estimates for an Acetic Acid Plant prepared by Messrs. Blair, Campbell Mc Lean of Glassgow.

Flag.(9)Modern methods of sulphuric acid manufacture by G.L.Moss (a copy of this has been sent to Director of Industries & Commerce).

Flag.(10) Physical and Chemical Data of Nitrogen Fixation (Ministry of munitions - Nitrogen products Committee). This is in connection with the use of the process of oxidation of amonia to provide nitrous gases in the lead chamber.

Flag(11). Oxidation of amonia applied to Vitriol Chamber plants (Ministry of Munitions).

I beg to be permitted to add that if we cannot have a big plant let us have a ton a day sulphuric acid plant and it will be worth our while having even this small plant making any profits, so long as we are assured there will be no loss. I shall not be rash, I hope, if I should mention, with about a lakh and a half to two lakhs of rupees we can have a small sulphuric acid factory run on proper lines and I shall guarantee no loss from it, even though I am not so sure about profits. I have not got a scheme ready for the small plant, but if it is desired to put up a smaller plant I shall write to England and get some estimates etc, when I shall be able to go into details. If we are not going to take up the manufacture of sulphuric acid, there will be no use whatsoever in simply drawing up schemes for nothing. When we write to foreign firms for quotations and specifications they go into expense and labour in preparing them. If no business results they will not need our subsequent enquiries. If there is a sporting chance of our starting a sulphuric acid factory, on however small a scale, I shall take up the business on hand and submit my estimates to you once more.

Personally I am of opinion that we have erred in the past in not deciding to have a sulphuric acid plant in Mysore quite ten years ago. It is fatal in the interests of the future of Chemical Industries of the State not to vote money for this at least now. The Government must do this, because people will not come forward to invest money on sulphuric acid, for the simple reason they are ignorant of the importance of the industry. If the Government start the plant, within two years of starting work there will be a cry from the public to have the factory transferred to Private enterprise.

With regard to this industry, the Department of Industries & Commerce should be prepared to take no refusal from Government. If necessary we may have to be refused one hundred times and still we shall have to appeal to Government for the hundred and first time and succeed,

I hope we shall succeed this time at least to induce the Government to vote money for this industry.

Translated Extract from an article on "The manufacture of acetic acid and acetone" by F. A. Buhler in the German "Journal of Applied Chemistry" in 1900.

There are two ways of disposing of the grey acetate of lime obtained in wood distillation, - manufacturing acetic acid or acetone from it. On account of its use in the manufacture of smokeless powder it has recently gained in importance and since a few decades it is being manufactured on a commercial scale very generally. The plant necessary for its production is shown in drawings 5 to 10 and is very similar to the one required for the manufacture of acetic acid and is designed to be worked in conjunction with a wood distillation plant.

Acetone is got by the dry distillation of acetate of lime at a temperature of 300°- 400 C.°

From the drying apparatus, the acetate of lime is put into distilling pans, which are shallow and made of cast iron. They are similar in construction to those used in the manufacture of acetic acid and are provided with stirrers, manholes, safety support and outlet for drawing out the vapours. The pan is surrounded by a lead bath to guarantee uniform heating. The value of having a lead bath is rather doubtful, as superheating is not completely excluded in this way. Sometimes, the outer jacket containing molten lead burns through, cracks, or becomes leaky and consequently the lead runs out. Hence the lead bath has been frequently discarded and heating is carefully regulated and looked after.

The acetone is driven out of the pans A, and the vapours are first passed through an arrangement A to collect the dust and tar and finally condensed in a cooled receiver B. By means of compressed air, the distillate is made to flow into vessel C and then lifted up into D in which it ~~ca~~ clears up.

Water is let into D to separate the tarry oils. These are drawn off into E whereas the acetone is led into F. From there it is filled into pan G and the first rectification is made over a solution of caustic soda. The first and last fractions are separated from the middle one in the containers I and K. The first fractions are led back into the pan G itself and the last fractions are put into a second pan L and rectified over patassium permanganate. The oily matter containing acetone which was run off into E is distilled with wood alcohol and used for methylating spirits. The residue is usually used as fuel. To hasten the removal of vapours from the pan A, it is connected with an exhauster N which sucks the fumes from A through O and compresses it into the dust chamber Q. H and M are the coolers belonging to G & L.

The manufacture of pure acetone as demanded by the stringent regulations in the various States of America is not an easy matter and requires good rectifying columns and skilled manipulation. This is because the impurities also have almost the same boiling point as acetone itself. The vapours of acetone are combustible and explosive when mixed with air. The heat generaters are therefore placed outside the main part of the factory or the pans A are separated from the rest of the plant.

One hundred (100) lbs of acetate of lime yield as a rule 24 - 25 lbs crude acetone or 20 - 22 lbs pure acetone. The plant in the sketch is for the working up of about 360 tons of acetate of lime and each pan used for decomposing the stuff is to be worked about 8 or 10 hours. For every ton of acetate decomposed one can count upon a profit of 45 to 55 shillings under normal conditions.

II.

Extract from Molinari's Chemistry, Vol. II Organic by T.H. Pope, Page 212, 1913 edition.

Acetone - In the crude form it is used in lac and colour

factories and in a more or less pur state in the manufacture of iodoform. Also at the present time pur acetone is employed in large quantities for gelatinising smokeless powders and, owing to the intense burning taste it imparts, as a denaturant for spirit, from which it cannot be separated by distillation.

Industrial Preparation. Calcium acetate obtained from pyroligneous acod (which see) is subject to dry distillation, the temperature being controlled so that it does not exceed 300°; the vapours evolved are rapidly cooled and condensed, giving crude acetone. In order to avoid superheating and irregularity during distillation, moist calcium acetate is sometimes employed. The acetone vapour escaping condensation is easily recovered by passing it through towers down which a spray of sodium bisulphite solution falls; this fixes the acetone, which can be liberated by distilling the solution in presence of an alkali. In France, Buisine has utilised the wash-waters of dirty wood to prepare acetone from the fat they contain. This process has been tried on an industrial scale at Roubaix, but as yet without marked success.

The crude acetone is purified by digesting it with quicklime and then distilling it from sodium hydroxide and subsequently over sodium sulphite.

Crude, impure acetone (oil of acetone) is sold at £3 8s. per quintal if dark or £ 4 if pale. Acetone for industrial purposes (85 to 90 per cent) sells at £ 6, the pure product at £ 6 16s. and the chemically pur (98 to 100 per cent at £7 8s. per quintal. The bisulphite compound is also placed on the market at £4 per quintal (or 14s. per kilo for the chemically pure). In 1908 England consumed 1500 tons of acetone (worth £ 100,000), which was almost all imported from the United States. In 1910 England imported 1100 tons of acetone, of the value of £57,000. In 1910 Italy imported 438 hectols of the value of £.2,600.

III.

Extract from the Industrial Chemistry, Organic, by Martin, Page 333, 1913 edition).

Acetone, Dimethylketone. CH_3COCH_3, is a clear, mobile, ethereal-smelling liquid, boiling at 56.5°C., and of sp.gr. 0.797 at 15°C. Although it occurs in crude wood spirit it is seldom isolated from it, being used in the impure state for denaturing alcohol. Pure acetone is manufactured on F.H.Meyer's system by heating crude calcium acetate to 300° - 400° in perforated trucks places in a retort (Fig. 153) : - $Ca(CH_3COO)_2 = (CH_3)_2CO + CaCO_3$. The volatile acetone vapours escape through a pipe and are condensed. There remains in the truck finely powdered $CaCO_3$, which is removed by opening the retort and running out the truck. The crude acetone contains homologous acetones and acids, as well as aldehyde, while CH_4 escapes. The acetone is purified by fractionating over lime. 100 kg. of 80 per cent. calcium acetate yield 25-30 kg. crude acetone of 60-70 per cent Tralles. 100 parts of wood yield about 1 part of acetone.

Up to 1912 the sole source of acetone was the dry distillation of wood and the subsequent decomposition of calcium acetate Owing to the modern use of wood pulp for paper, and the consequent diminution in the supply of wood available for destructive distillation, coupled, with low yield of acetone (only 1 per cent. of the weight of the wood), the supply of acetone was not meeting the rapidly increasing demand, and so the price had been rising until in 1912 it reached £.89 per ton. In that year A Fernback introduced his Fermentation Process for producing acetone from starch. Grain, potato, or other starchy mashes are inoculated with Fernbach's culture, and allowed to ferment. The starch breaks down into higher alcohols (Principally butyl) and ketones, of which acetone forms a considerable portion. The mashes are then distilled, and acetone form a

separated by fractional distillation. It is found that 15-20 per cent of the starch is tansferred into acetone. The crude starch acetone cotained 78 per cent pure acetone, 11 per cent. of "Miscible Ketones" and 11 per cent, impure acetone. The Synthetic Products Company of London propose to place the acetone on the market by this process at £35-£65 per ton.

Uses of Acetone. Acetone is a valuable product employed for making chloroform (p 378), iodoform (p.380) and as a solvent for acetylene (pp.401, 403); in making celluloid (p.208), and synthetic druggs (p605). By far the greater quantity, however, is employed as a solvent for nitrocellulose in the manufacture of blasting materials and smokeless powders, such as cordite (see p. 639).

For explosive manufacture the acetone must be free from all acid or aldehyde, boil at the correct temperature, and yield with iodine and caustic soda solutions the correct amount of iodoform, according to the equation:

$$(CH_3)_2CO + 3I_2 + 4NaOH = 3\,NaI + CHI_3 + Na(C_2H_3O_2) + 3\,H_2O.$$

Acetone (1 molecule) Iodoform (1 Molecule).

Statistics - The English import of acetone in 1910 amounted to 22,000 cwt. of value £.57,000. The world's supply of acetone in 1912 was estimated at 10,000 tons.

Acetone as a Solvent for Varnish-Gums, Resins and Shellacs.

A critical examination of the solvent properties of acetone, produced by the destructive distillation of calcium acetate, is being conducted at the Mellon Institute of Industrial Research of the University of Pittsburgh, Pittsburgh, Pa., in order to ascertain its value as a commercial solvent.

In the course of the work on the solvent properties of acetone, a number of gums, shellacs and natural and artificial resins have been investigated. The percentage of acetone-soluble material in water-gums was found to be considerably less than in copal resins The former contained from 7 to 17 per cent of acetone-soluble material, while the solubility of the latter class of gums varied from 30 to 100 per cent in the same solvent. The solubility of water-gums at room temperature was found to be quite low, while the copal resins tested were either miscible in all proportions or in a concentrated solution with a separation on dilution. The solubility of shellacs and resins varies somewhat with the grade of product. The WW grade resin is entirely soluble and miscible in all proportions, while inferior gades contain different amounts of insoluble material: the part soluble, however, is miscible in all proportions at 25 deg. C.

It was noted that the addition of another solvent, as methanol, to acetone greatly increased its solvent properties. Acetone was found to be miscible in all proportions with all the ordinary commercial solvents tested, thus permitting composite solvents to be had, the solvent power of which greatly exceeds that of the individual solvents.

The present grade of acetone obtained from calcium acetate is of excellent homogeneity and uniformity. Its low specific gravity gives it a lawger volume per pound and thus lowers its price per gallon when compared with a number of ordinary commercial solvents.

(Extract from "Chemical & Metallurgical Engineering" Vol 27, No.14, Page 693.) — October 4. 1922

INDUSTRIAL DEVELOPMENTS RELATING TO THE MANUFACTURE OF ACETIC ACID AND ACETONE.

Tremendous Demand for Acetone for Explosives led to its production from Molasses, Alcohol and from Calcium Carbide - Wood-Distillation Industry Faces Disaster unless it develops scientifically.

by Harold Hibbert
Director Research and Technical Division,
Ralph H.Fuller & Co., Inc.

Prior to 1914, more than half the entire world's supply of acetone and acetic acid was furnished through the medium of the wood-distillation industries of this country and Canada the remainder being contributed principally by Austria-Hungary. When wood is heated in closed iron retorts in absence of air, it undergoes a decomposition whereby certain volatile constituents such as acetic acid, acetone and methyl acetate are driven off, the residue consisting of wood charcoal. In practice the crude acetic acid is neutralized by the addition of lime, which is then converted either into refined acetic acid or into acetone.

Acetic acid is used very extensiverly in the chemical industry for the manufacture of dyestuffs, pharmaceutical preparations, varnish for aeroplane wings and also as a condiment, while acetone finds its main outlet as a general solvent for varnish, lacquers, a and in the manufacture of explosives such as cordite. This latter is used in immense quantities by the British and other Navies, and is made from a mixture of guncotton with nitroglycerine. In order to "compound" these materials, that is, to enable the gun cotton to become thoroughly incorporated with the notroglycerine, it is necessary to employ a solvent which in this case happens to be acetone. Many other solvents have been tries out, but this has been found to give thebest results. The British Admiralty early foresaw the necessity of obtaining large supplies of this material and a few months after war broke out they were endeavouring to contract for an immediate supply of approximately 15000 to 20000 tons. This amount was considerably more than the entire world's

annual production.

According to an article by messrs. French & Withrow, the annual production of grey acetate of lime in this country in 1914 amounted to approximately 84,000 tons since increased in 1917 to over 100,000 tons. This is equivalent to about 17,000 tons of acetone if all of it were employed for this purpose. As a matter of fact the greater part was used for the manufacture of acetic acid, the output of acetone being in the neighbourhood of 7500 to 8000 tons annually. Faced with a sudden demand for an immediate increase in this commodity to some 20,000 tons, it was evident that new measures would have to be adopted for its manufacture, since it was altogether impossible to obtain this amount from the wood-distillation industry in the short time available. The assistance of the chemist and chemical engineer were thererore sought, and it is to the credit or the profession that they have provided an eminently satisfactory solution to meet this most urgent demand. The first line of attack was found in an attempt to increase the acetic acid production by the fermentation of various carbohydrate materials, as for example, molasses, through which alcohol and from this, acetic acid in turn can be manufactured.

Working in co-operation with the British Government, the United Stated Industrial Chemical Co, has erected a large plant as Curtis Bay, and in spite of the many difficulties encountered both from a chemical, biological and engineering standpoint, they have so far succeeded that they are now manufacturing acetic acid, equivalent to approximately 70,000 pounds of 100 per cent strength per day, which is used for the manufacture of acetone and methyl acetate. This huge amount is all made from vinegar obtained from molasses alcohol by the quick fermentation process.

Some idea of the work involved in such an undertaking may be obtained when it is remarked that it was found necessary to construct special tank steamers for the conveyance or the molasses from Cuba to Baltimore. The generators comprise one series or 200 tanks, 25 ft. by 18 ft., and a second series of 960 of a size of 10 ft by 18 ft.

by 18 ft. These are filled with beech shavings through the agency of which the oxidation of the alcohol to acetic acid is effected.

Anyone acquainted with the delicate nature of the changes taking place in such fermentations is well aware of the extraordinary care and oversight which it is necessary to give to such operations to insure a commercial success, and the fact remains that the plant is now functioning day in and day out with continuous regularity.

To transport the dilute acetic acid liquors to the evaporators requires approximately 35 miles of wooden piping and the evaporators installed for the concentration of the calcium acetate liquors which are capable of handling some 200,000 gallons of liquor per day, require for this purpose a power consumption of 3000 horsepower

While in all prpbability the manufacture of acetic acid and acetone by this process will not be profitable after the conclusion of peace, there is no doubt but that the company operating this plant will have first claim to be the largest manufacturers of alcohol in the world and the country should be proud of their supermacy in this respect.

Fernbach process. Fermentation of Starch.

Even with this additional amount of acetone and acetic acid available, it was evident that there would not be sufficient to meet the requirements of the British Government and their allies, so that other processes came up for discussion. Among these was one relating to the "Fernbach" process. This consists in the fermentation of starch from corn or other grain by means of a special ferment which has the power of resolving the carbohydrate material into a mixture consisting essentially of butyl alcohol and acetone, the former largely predominating. The conditions of fermentation call for strict, careful chemical and biological control and those responsible for its development are to be congratulated on the successful results obtained. It is understood that the output

of acetone at the plant in Toronto now amounts to 100 tons per month while from the one in this country it approximates close to 250 tons. It would be seen that the industrial disposal of serious consideration, but it should offer no insuperable difficulties to the chemical profession.

Of the other processes calling for consideration, one of the most interesting was that relating to the manufacture of acetic acid from acetulene, regarding which a number of German patents had already been taken out some seven or eight years ago.

It has been known for a considerable period of time that when acetylene gas is passed through a solution of a mercury salt in dilute acid, it combines with the water, uielding a somewhat colatile liquid known as acetaldehyde, from which acetic acid in turn is readily obtained by the action of atmospheric oxygen. While those acquinted with the subject were aware of these developments, and with the fact that a plant had already been in operation in Geremany for some two or three years prior to the outbreak of war, it nevertheless came as a great surprise to the majority of those interested that such was in reality the case.

The incident in fact merely furnishes another remarkable instance of the wonderful foresight of the German authorities in providing for their own requirements of such commodities, both from an industrial and especially from a military standpoint. To render themselves independent of this country in the matter of acetate of lime, research work was encouraged both in the universities and in the industry, and after laborious and painstaking investigations extending over many years, they were in a position to manufacture acetic acid and acetone from naturally occurring materials, nemely, lime and coal, both available in large quantities in their own country.

Synthesis from Line and Coal.

Apart from a few experiments carried out by the writer while with the duPont Powder Company, nothing had been attempted in this

country in Canada. However, the British Government was very fortunate in being able to obtain the hearty co-operation and assistance of the Shawinigan Light & Power Co., a Montreal corporation closely identified with the Canada Carbide Co. This concern on being approached by the British Government agreed to commence work immediately on the scientific aspect of the problem and was ably assisted in this connection by Prof. Nuttan of the McGill University. Montreal, Canada. They were fortunate in obtaining the services of Mr. Howard W. Matheson, formerly of the duPont Powder Co, and it is due to the chemical research investigations carried out by this chemist (ably supported as he was by the engineering skill of the vice-president of the company, Mr. Julian C. Smith) that they were successful within a period of one year not only in completing the experimental work (regarding which they were up to that time in complete ignorance) but also in erecting and starting the plant in actual operation.

The experimental work was started in December, 1915, and the plant was completed and commenced to operate in January 1917, the total cost being somewhat over two million dollars. The output amounts to 56,000 pounds of 100 per cent acetic acid daily when it is remembered that new and difficult questions of plant construction had to be faced, special tupe of construction relating to acid-proof materials and other important problems solved (in fact the creation of quite a new industry in this connection), and also that entirely new methods had to be devised in connection with each stage of the process, such as the electrolytic regeneration of the mercury etc., some idea may be obtained of the immense amount of labor involved. Not only was it necessary to build the chemical plant, but alongside of it a plant for the necessary calcium carbide had also to be erected and put into operation.

Second Plant Approaching Completion.

When this country entered the war the question was discussed as to the advisability of erecting here a simmlar plant, but in

view of the length of time it would take to develop the process and the saving which would be effected by cooperating with the Canadian Electro Products Co., an agreement was entered into for the duplication of the Canddian plant at an expenditure of over two million dollars. This second unit is now rapidly approaching completion and is expected to be in operation about December.1. The two plants will have an approximate production of around 55 tons per day of 100 per cent acetic acid.

The question as to what is to be done with this immense production after the war is one calling for serious consideration, as this is greater than the entire world's consumption. There would seem, however, to be no reason why the cost of manufacture should not enable them to provide the industry with far cheaper acetic acid than was obtainable prior to 1914, and in this case the cinsumption will undoubtedly be largely increased in such industries as the manufacture of crude rubber lacquers, dyestuffs etc. It should also be borne in mind that it is not at all improbable that extensive new industrial outlets will be found for acetaldehyde. This product as far as its chemical reactivity is concerned may be said to bear the same importance to the so-called "aliphatic". chemical compounds as benzene does to the aromatic derivatives From it by various chemical processes a whole series of valuable products such as glycerine derivatives, solvents for nitro and acetyl cellulose, useful varnishes, camphor substitutes synthetic rubber and numerous pharmaceutical products can be obtained, the development and exploitation of which will certainly follow on the conclusion of peace.

Wood Distillation Industry on the Defense.

It is evident from the above that the wood-distillation industry after the war will have to fight for its existence, as the price of acetone will undoubtedly fall to a low level. In all probability the price of acetic acid made from carbide will be such that it will be impossible for them to compete. There is, however, a "life saver" in the situation in that the industry

possesses in acetone, crude acetone oils, and wood tar, a very valuable source of, as yet, undiscovered revenue. If the wood distillation industry will only enlist the services of the industrial chemist, they will find that acetone can be readily and cheaply transformed into valuable solvents for varnishes and nitrocellulose lacquers. Moreover, it can be employed for the manufacture of synthetic rubber and glycerine substitutes, the latter possessing properties comparable to those of the ordinary glycerine of commerce. From the wood tar itself the well-known beech-wood creosote can be made, the demand for which is increasing rapidly, while the production has remained practically constant. Recent researches have shown that it is impossible to submit the wood tar to a process of distillation and by this means separate out certain of its constituents possessing marked germicidal action. This special property may then be intensified to a remarkable extent by certain simple chemical processes, thus increasing the value materially for purposes such as wood preserving, disinfectants, sheep dips etc.,

There would also appear to be no doubt but that certain fractions of wood tar may be used to great advantage in the manufacture of varnish compositions and coatings, similar to the phenol formaldehyde condensation products, while the pitch obtained as a residue when manufactured under certain well defined conditions is found to possess properties rendering it much more valuable than ordinary coal tar pitch for certain insulating purposes. Furthermore, there is a wide field in the application of certain constituents of these oils for use as protective coatings in the lining of acid vats, as extended experiments would seem to indicate that corrosion could best be guarded against in the handling of large quantities of acid liquors of various kinds by the employment of such materials.

Germany and Switzerland Make Alchhol And Acetic Acid from Calcium Carbide.

Nothing is clearer than the fact that unless the wood --

wood distillation industry awakens to the necessity of the employment of the trained research chemist and chemical engineer in the development of their business, the industry faces a very disastrous future. That this is the case is borne out by the fact that both in Germany and in Swtizerland large electrical installations have been erected for the manufacture of alcohol and acetic acid from calcium carbide. The one in Switzerland is expected to use a minimum of 20,000 and a maximum of 30,000 hp. and produce annually 7500 tons of alcohol as a minimum and 10,000 as a maximum. It is stated that this will make Switzerland an exporter instead of an importer of alcohol. The writer is informed by the American Consul in Berne, Switzerland, that the manufacture of acetic acid has already been commenced and that the manufacture of alcohol will be taken up later. In the Swist Government reports onthis subject, attention is drawn to the fact that Switzerland is dependent on this country and Austria Hungary for its supply of acetate of lime. Government support for this undertaking was obtained with a view to making the country economically independent in this respect.

In Germany, according to the Chemical Trade Journal, the quantity of acetic acid produced in 608 vinegar factories amounted in 1913 to about 13,000 tons, while the quantity produced from calcium acetate and wood vinegar amounted to 23,000 tons of anhydrous acid. During the war several large factories for the production of acetate acid from carbide had been completed, while others are in course of construction with a view to the manufacture of artificial rubber. The factories if fully utilised are capable of producing 25,000 tons of acetic acid annually.

Much valuable research work has already been carried out under Government auspices at experimental stations such as the one at Madison, Wiscousin, and if full advantage were taken of these results, as well as of the desirable cooperation of the industry, with such well equipped institutions as those at

at Syracuse, Cornell and Michigan, the future of the Industry might be assured. As some of these institutions are supported by State funds, it is difficult to understand why their cooperation should not be sought and in fact insisted upon.

The article by Messrs. French & Withrow, referred to above, gives a very complete historical review and account of present day conditions in the wood distillation industry and contains much valuable food for thought in this connection.

NEW YORK CITY.

Ind. 131-22-2 39

180. 9.C. 3865 dt 14/12/22

To

The Offg. Director,
Industries and Commerce Dept

S i r ;

With reference to your letter No. 0.C.1108 dated 17th October 1922 proposing to ~~~~~ for the manufacture of sulphuric acid, I am directed to state that your report does not clearly go into the commercial aspects of the case, nor is any case made out for Govt. embarking on this industry at the present juncture. On what basis it is stated that the Dept will be able to carry on this industry on a profitable basis is not clear. How the establishment of this industry entirely independent of the Iron Works, is urged is not apparent. Even in regard to the starting of a small plant no details are given.

I am to state that it is difficult for Govt. to pass orders without a definite and detailed scheme before them. It is not of the question owing to financial reasons to entertain any proposal for the establishment of a large ~~~~ plant.

I am to request you therefore to be so good as to furnish detailed proposals regarding the smaller plant, as an experimental measure, after consulting the Secretary to the Board of Management of the Iron Works who has collected information regarding the disposal of

p.t.o.

of Acetate of Lime produced by the Iron Works to the best possible advantage of the concern.

I have etc.,

21.11.22

18/12/22

Genl. Secretary to Govt.

Subscribed
Blanche Hale
Pleas Address
Rev.
Rabbi & Mrs. Abram Hirschberg
Ki Enclosures Received
With Best Wishes
Sincerely
Mrs
21/

G. R. S. VI—G/32]

SUBJECT.....

.....

.....

Diary No. of letter replied to

General and Revenue Secretariat

( )

, the *191* .

Date of issue

Signed by

Section I&T.

File No. 131-22.

Serial No. 3.

No. D.C. 4005

Encl.- 2 files as per lists attached

To

The Offg. Director of I&T

Sir,

In Continuation of my letter no: D.C. 3865/I&T. 131-22 dt 14/12/22, I am directed to return herewith the entire records received with your letter no: D.C. 1108 dt 17/12/22 and to request that the receipt may kindly be acknowledged.

I have the honour to be,

Sir,

Your most obedient servant,

21.12.22

for Secretary

over.

Submitted for approval

Sd/- 21/12/22

Received the files

personally

21.12.1922.

Sd/- 21/12/22

36170

TELEGRAPHIC ADDRESS "INDUSTRIES"

4614.

In reply please refer to
No. 283 C

ENCL. No. nil

OFFICE OF THE
DIRECTOR OF INDUSTRIES AND COMMERCE, IN MYSORE.

Bangalore...3rd....April.....192 3
5-15

FROM

P. G. D'SOUZA, ESQ., B.A., B.L.,
Director of Industries and Commerce in Mysore
Bangalore (India)

6 APR 1923

To

The Secretary to Government,
General Department,
Bangalore.

SIR,

With reference to your No. IC.3865/ I & C 131-22-2 of the 14th December 1922, regarding the manufacture of Sulphuric Acid, I have the honour to state that information is being collected as to the feasibility of starting a small plant manufacturing one ton of sulphuric acid per day on a commercial basis and quotations have been called for and a further communication will be sent as soon as information is ~~xxxxxxx~~ received. The Industfial Chemist met Mr. Madhava Rao, Secretary to -- the Board of Management of Iron Works, also and he does not possess -- ~~much~~ more information than the Department to prepare a complete scheme without reference to manufacturers abroad.

I have the honour to be,
Sir,
Your most obedient servant,

DIRECTOR.

SDN)

Abond.
A further reference has to be awaited.
6.4.23.

7/4/23

5.20-546
17.4.23

18.4.23

6914

TELEGRAPHIC ADDRESS "INDUS COM."

In reply please refer to No. 753/K

ENCL. No. Two

SECRETARIAT
- SEP 1923
INDUSTRIES & COMMERCE
BRANCH.

OFFICE OF THE
DIRECTOR OF INDUSTRIES AND COMMERCE IN MYSORE,

Dated, Bangalore, the 28th Aug: *192* 3.

FROM

P. G. D'SOUZA, ESQ., B.A., B.L.,
Director of Industries and Commerce in Mysore.

DIARY NO. 919
Bangalore (India)
19 2R 1923
Section. 94C
File No. 131-M
Serial No. 4

To

The Secretary to the Government of Mysore,
General Department,
Bangalore.

Sir,

With reference to correspondence ending with your No: IC.690/I&C.151-22 of the 7th instant, calling for further proposals in the matter of starting a small plant for the manufacture of Sulphuric acid, I have the honour to forward herewith for the information of Government copies of enquiries the Industrial Chemist has obtained about a ton a day sulphuric acid plant. It will be seen therefrom that such a small unit is not likely to be a very economical proposition and I am not in favour of trying it on such a small scale.

I am addressing the Government Director of the Mysore Iron Works whether they intend putting up a plant and on receipt of his reply, I shall address you again in the matter of the possibility of starting a bigger plant.

I have the honour to be,
Sir,
Your most obedient servant,

DIRECTOR.

BV)

Copy of letter F1/VFG (Chem. Plant Deptt.) dated 25th April 1923, from Messrs. Simon-Carves Ltd., 20, Mount Street, Manchester, to S.G.Sastry, Esq, B.A.,M.Sc., F.C.S., Government Soap Factory, Bangalore.

Sulphuric Acid Plant.

We are in receipt of your letter of the 23rd Ultimo, indicating that the installation of a sulphuric Acid Plant with a capacity of 10 tons per day is, for the time, being, held in abeyance, and that it is the intention of the Department of Industries to erect an experimental plant at Bangalore with a capacity of 1 ton per day.

Owing to the small capacity of the experimental plant required it would not be advisable to erect one of our latest type units, miniature (which would be the case when producing only one ton a day); but, however, we could design a modified plant to produce this small quantity of acid the results from which, read in conjunction with the savings in raw materials and labour which could be anticipated on an up-to-date plant, would fully demonstrate that acid in quantity could be produced economically.

Before sending you a specification and tender for this modified plant the following remarks may be of interest to you and we will await your comments.

The capital cost of a plant to produce 1 ton of Sulphuric acid per day, if designed to embody all our latest improvements in sulphuric acid manufacture, and complete with Glover Tower and Gay-Lussac Towers, etc., would be very high and tend to make the production uneconomical and probably prohibitive, owing to the very large overhead charges.

Therefore, for this quantity of acid it would be necessary to alter our system considerably in order that the capital cost be reduced at the expense of nitre recovery and acid concentration. In this case our plant would consist of pan type sulphur burner in which the sulphur is burnt to SO_2, the necessary nitrous gases for oxidation to SO_3 being generated from nitrate of Soda and sulphuric acid either in cast iron pots placed inside the sulphur burner itself or immediately after the sulphur burner in the hot flue.

The sulphur burner would be arranged to allow of ample radiation of heat to ensure that the gases going to the first chamber, leaving the bubbler (described later), would be approximately 90/100°C.

The chambers, of which there would be two or three small ones, would be long and low proportioned to give a chamber capacity of some 18 to 20 cubic feet per pound of sulphur burnt per day.

The gases from the last chamber would be exhausted into the air with no recovery of nitrogen oxides; consequently with this system there a high nitre consumption may be expected.

Further, in order to keep the nitre consumption compartively low, the chambers are so worked that as much nitre as possible is deposited in the bottom acid of the last chamber. This to a certain extent is recovered by the passage of the bottom acid through a very small bubbler or brick packed box, placed at the beginning of the chamber set which acts more or less as a cooler and denitrator, but does not function as a Glover Tower for concentration.

The effect of this nitre in the bottom acid increases the action on the lead, consequently the ware and tear is heavier, especially in the last chamber, but with close attention this does not become serious.

The acid production from such a plant will be at a maximum of 100/120° 200 twaddle, or say 60/68% H_2So_4.

A plant of this size would not warrant the cost of an up-to-date installation of water atomising for the addition of the necessary water vapours to the chambers, and in this case we would arrange for steam.

We trust the above information will enable you to arrive at a decision whether you will proceed with the installation of small experimental unit based on the lines as indicated above.

" c o p y "

R Cranfield Kilmarnock
for Director

RN

Office of the Industrial Chemist in charge
of the Government Soap Factory, Bangalore,
Dated, 23rd March 1923.

To

Messrs: Simon Carves Ltd.,
20, Mount Street,
Manchester. England.

Dear Sirs,

Ref: Your Specification No: CP. 1953 dated 9th May 1920 and all the correspondence connected with it.

========

As you might be aware of the fact, the Government of Mysore have started the manufacture of charcoal pig iron at Bhadravati (Shimoga District, Mysore State). The charcoal is obtained by means of the destructive distillation of wood. In this process they expect to produce annually more than two thousand tons of Grey Acetate (80%) of lime. Originally there was an idea of manufacturing acetic acid from Grey Acetate of lime. For this it was calculated that about 6 tons of sulphuric acid per day would be required. Putting the growing demands for the sulphuric acid for other purposes at 4 tons per day, it was thought, it would be an advantage to have a ten ton a day sulphuric acid plant at Bhadravati. It was in this connection that I had obtained your specifications and quotations (No: C.P. 1953 dated 9-5-20)

This question of the manufacture of sulphuric acid in the State of Mysore has been engaging the attention of the Government of Mysore in some connection or other all these days. But at present there is a change in the situation. It is practically settled that the question of the manufacture of acetic acid from Grey acetate of lime should be deferred for the time being. After getting more experience at Bhadravati, the question ~~of the manufacture~~ will be taken up once more for serious consideration. It is about 2½ months since they started operations

operations at Bhadravati. Mysore charcoal pig iron of a very grade is now on the market.

In the original scheme the biggest outlet for sulphuric acid was in the manufacture of acetic acid. That question has been deferred for another couple of years. But it is the intention of the Department of Industries, to have an experimental plant at Bangalore producing one ton of sulphuric acid per day.

Can you kindly forward me specifications and quotations for an experimental plant producing one ton of chamber acid per day? If the Department of Industries does not take up even this small plant, it is quite likely I may be able to interest a local firm to put up the plant immediately. We shall import sulphur from outside. We shall have to use nitre for oxidizing purposes. I am not in a position to judge how many of the latest improvements that have been effected in the chamber plant and the chamber plant operations can be introduced in the small plant also. You will be able to advise me on these, with your extensive experience.

Soon after the receipt of your estimates, I shall work up the costs and find out, whether the cost of production will warrant us to put up the plant or not.

If I can ~~made~~ demonstrate that I can manufacture one ton of sulphuric acid per day in a profitable manner, I believe, I shall be able to get through the bigger in a very short time. It is a new Industry and there is on account of this, I must confess, a little too much caution. I am all the more anxious to demonstrate with this experimental plant that sulphuric acid can be successfully manufactured at low prices. Success in this experimental plant means the taking up of the larger schemes without any loss of time.

Can you kindly give me an idea as to the price of acid carboys or stoneware jars that will be required to handle the acid.

Hoping to receive an early reply.

"Copy."

Ramanlica Abeemanga

for Director

G.R..S VI G 34]

SUBJECT.....

.....

.....

Diary No. of letter replied to.....

General and Revenue Secretariat

( )

the 192

Date of issue 27-9-23

Signed by Dte Secy K

May this be

i Printed ?

ii treated as a standing order ?

iii published in the Gazette, English Part ?

iv translated ?

v placed at the disposal of the press ?

vi published in the Gazette, Kannada Part ?

Section I & C,

File No. 131-V

Serial No. 5

Proceedings of the Government of His Highness the Maharaja of Mysore.

Read—

Letter no. O.C. 1108 & 17.11 from the Offg. Director of I & C submitting proposals for the manufacture of Sulphuric acid, either at the rate of 5 tons a day at Bhadravati or at the rate of 1½ tons a day at Bangalore.

~~Order Thereon~~ No.

2. General Secretary's letter no. 3865/I & C 131-22-2 & 14-12-22 requesting the Offg. Director of I & C to furnish

the details relating to the
smaller plant after consulting
the Secretary to the Board of
Management of the Iron works.

3. Letter no. 753 A & 31. 8. 23
from the Offg. Director of I.A.C.;
stating that a ton a day plant
will not be economical and that
he is addressing the Govt.
Director of the Mysore Iron works
in regard to the possibility of
starting a bigger plant

Order No 1611-12 & 27/9/23

Recorded.

List of enclosures.

26. 9. 23
Genl. Secy.

To the Offg. Director of I.A.C.
The Govt. Director, Mysore Iron works.

Copied by

Examined by

WD 1866—GPB—1,000,00—21-12

12897

TELEGRAPHIC ADDRESS "INDUS COM."

In reply please refer to
No. G. 877/C

ENCL. NO.

10 OCT 1923
INDUSTRIES & COMMERCE BRANCH

OFFICE OF THE
DIRECTOR OF INDUSTRIES AND COMMERCE IN MYSORE,

Dated, Bangalore, the 8th Oct: *1923*.

FROM

P. G. D'SOUZA, ESQ., B.A., B.L.,
Director of Industries and Commerce in Mysore

DIARY NO 1281

Bangalore (India)
Section. G & C.
File No. 131-22
Serial No. 6.

To

The Secretary to the Government of Mysore,
Revenue Department,
Bangalore.

Sir,

With reference to Government Order No: IC.1611-12/I&C.131-22-5 of the 27th September 1923, regarding the scheme for the manufacture of sulphuric acid, I have the honour to state that the Bhadravati Iron Works have intimated that they have no intention of starting the bigger plant. Though I am strongly in favour of starting a sulphuric acid plant as it is an important basic industry, I am not sure whether even a 5 ton plant will pay and there is likely to be some difficulty in disposing of the sulphuric acid. The Dharmasji Morarji Chemical Works which are now manufacturing sulphuric acid on a large scale in Bombay find it difficult to dispose of their output. If at all the scheme can be carried through, it can only be in conjunction with the mills and large industrial concerns using sulphuric acid. The times are not propitious and as there are no funds the scheme may lie over till next year. Meanwhile advantage will be taken of the deputation of an officer in connection with the British Empire Exhibition to get full information regarding machinery etc., and the proposal resubmitted with further details.

I have the honour to be,
Sir,
Your most obedient servant,

DIRECTOR.

BV)